

matches features from many species of *Erianthera* and serves as a link to connect that salient section with *Eupenstemon*.

Note on Section *Saccanthera*

Penstemon serrulatus Menz. ex Smith, in Rees' Cycl. 26: Penstemon, sp. 5, 1813. Since publishing on the section *Saccanthera*,¹ it has been brought to the author's attention by F. W. Pennell that this earlier name must replace *P. diffusus* Dougl. ex Lindl. (1828) for the well known species that occurs chiefly to the west of the Cascadean crest from British Columbia to Oregon. The type of *P. serrulatus* has not been seen by the writer, but is probably preserved in the British Museum. A specimen which is doubtless an isotype, however, in Herbarium Hookerianum, Kew, plainly establishes the identity of the species. The latter specimen is labelled in Hooker's hand "Penstemon serrulatus" and, on succeeding lines, "Menz." and "A. M."

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SURFACE PLANKTON DIATOMS IN THE NORTH PACIFIC OCEAN IN 1934

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In connection with general plans of the United States Navy to become better informed concerning a number of conditions in the North Pacific Ocean, the United States Steamship Bushnell made a cruise in the summer of 1934 around the Gulf of Alaska and southward from the Aleutian Islands to the Hawaiian Islands. On this cruise Mr. R. R. Revelle of the Scripps Institution of Oceanography served as a special investigator giving particular attention to collecting water samples and hydrographic data. In addition he collected 141 surface catches of phytoplankton (mostly diatoms), using the standard Scripps Institution method of filtering a measured amount of water through number 25 bolting silk. The amount filtered at each catch on this cruise was twelve liters. I have completed the examination of this material, but it is not probable that a report covering full detail can be prepared soon, although Mr. Revelle has his own report far advanced. For that reason I am writing this note for the benefit of readers interested in the more general features.

¹ Univ. Calif. Publ. Bot. 16: 367-426. 1932.

Catches were begun north of Vancouver Island in the general region where a great abundance of diatoms was found in 1923 (Bull. Scripps Inst. Oceanog. Tech. Ser., 1: 39-48) and a moderate abundance in 1924 (*ibid.* 2: 139-153). Although the catches of both of those series were made more than two months earlier in the seasons, the 1934 series resembled them in showing a considerable abundance, especially near the southern and eastern shores of Calvert Island, where numbers of more than 2,000,000 cells per liter were reached. This similarity appeared to hold also in the vicinity of Princess Royal Island where small catches in the more southerly part were succeeded by a large one at the north end. The largest catch in the 1934 series was made almost west of Point Baker (north end of Prince of Wales Island) in Sumner Strait, a condition apparently different from the other series when at the earlier period only small catches were taken in Sumner Strait. But, in the main, the catches in Alexander Archipelago in 1934 in July tended to show large and small catches according to locality much like those in April of the earlier series. Such conditions suggest that the productive period may extend over a fairly long time where the locality is favorable, and that certain localities may be favorable or unfavorable year after year because of characteristics peculiar to their geographic or topographic position.

Skirting the northern border of the Gulf of Alaska in August, no large catches were found, but two of moderate size (over 100,000 cells per liter) were taken near Kenai Peninsula. This showing seems to be in direct contrast to that of 1923 when fourteen catches of sizes comparable to this were found around the northern border of the Gulf. However, the contrast may be only apparent because, in addition to the time difference, there was a difference in distance from shore over most of that part of the cruises. In 1934 the Bushnell remained much farther from shore until nearing the Kenai Peninsula than did the United States Coast and Geodetic Survey Ship Pioneer in 1933. So far, the Scripps Institution has never received any large catch from far offshore in the Gulf of Alaska, although a considerable number of catches have been obtained in four different series.

Near the Alaska Peninsula and the Aleutian Islands the agreement with the results of former series was fairly good, no large catches being obtained, and very few showing an abundance greater than some thousands of cells per liter.

From the western section of the Aleutian Islands, on the run southward to Honolulu, the sampling was entirely new so far as is known at the Scripps Institution. Catches in that part of the cruise were made mostly between meridians 174 and 158 West. Out of the ninety catches taken on the southward run

about half yielded one or more specimens of at least one species of diatoms in the fraction of the catch examined. In the open ocean at points about three hundred miles south from the nearest land (some of the smaller islands of the Aleutian chain) catches were obtained showing three or more species of diatoms, one with eight species yielding more than 2000 cells per liter. Seven of these species are often seen along the California coast, but *Coscinodiscus marginatus* Ehr., which was represented in every catch for about three hundred miles, is rather rare in California waters.

The largest catches obtained in mid Pacific were between latitudes 40° N. and 43° N., one reaching the really striking total of 220,000 cells per liter. The position of this was latitude $42^{\circ} 23'$ N., longitude $169^{\circ} 47'$ W. The species *Chaetoceros neapolitanus* Schroed. was mainly responsible for such abundance, but the numbers of the unicellular *Chaetoceros peruvianus* Btw. were notably large (more than 40,000 cells per liter). These relatively large catches in mid ocean were taken late in August at a time when abundance of plankton diatoms is always very low near La Jolla. However, both species are likely to be found in considerable numbers offshore and below the surface level in the La Jolla region. The abundance of both species in this particular locality may have been due partly to their oceanic habit as well as to certain hydrographic and meteorologic conditions peculiar to mid ocean.

I suppose that it is easy to see that the greatest importance of this pioneer series in investigation of phytoplankton in mid ocean in the North Pacific lies in the fact that it has shown that diatoms may occur at the surface in notable numbers and in the resultant suggestion that there is a mid ocean flora to be investigated. With such abundance at the surface, it is reasonable to suppose that there may be larger or smaller numbers at lower levels, just as has been found to be true in localities nearer to shore. In addition, the records of occurrence of several species in a totally new locality have a definite interest, aside from the possibility that renewals of populations on the California coast may be more or less related to mid ocean occurrences or productiveness.

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